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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/680,564 | 10/07/2003 | Takuya Miyakawa | 9319S-000573 | 4157 |

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HARNESS, DICKEY & PIERCE, P.L.C.
P.O. BOX 828
BLOOMFIELD HILLS, MI 48303

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| EXAMINER |
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TUROC, DAVID P

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| ART UNIT | PAPER NUMBER |
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1762

DATE MAILED: 03/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/680,564 | MIYAKAWA, TAKUYA | |
| | Examiner | Art Unit | |
| | David Turocy | 1762 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 8, 13, 14 and 17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 8, 13-14 and 17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

TC

DETAILED ACTION

Response to Amendment

1. Applicant's amendments filed, 2/25/2005, have been fully considered and reviewed by the examiner. In light of the amendments, the 35 USC 112 second paragraph, 35 USC 102(b), 35 USC 103(a) rejections have been withdrawn. In addition, the claim objections to claim 8 have been withdrawn. The examiner notes the amendments to independent claims 1 and 13 and the cancellation of claims 6-7, 9-12, 15-16 and 18. Claims 1-5, 8, 13-14, and 17 pending.

Response to Arguments

2. Applicant's arguments with respect to claims 1-5, 8, 13-14, and 17 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

3. Claim 13 is objected to because of the following informalities:

In claim 13, line 5, the phrase "to make a solidified layer porous" is awkward; the Examiner suggests rewriting the phrase to read, "to make a solidified porous layer".

Appropriate correction is required.

Specification

4. The disclosure is objected to because of the following informalities:

The examiner cannot ascertain a definition for a "flushing device" from the prior art. The examiner is regarding this is a typographical error and/or translation error and interpreting "flushing device" to be "flashing device". Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-5, 8, 13-14, and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 13: The examiner cannot ascertain a definition for a "flushing device" from the prior art or the disclosure. The examiner is regarding this is a typographical error and/or translation error, and for the purposes of applying prior art interpreting "flushing device" to be "flashing device".

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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1. Claims 1-5, 8, 13-14, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 00/06491 A1 in view of You et al. (US 6,407,009) and further in view of US Patent 4571486 by Arai et al.

*** Please note U.S. Patent No. 6,656,527 to Gessner et al. is provided as a working English translation of WO 00/06491 A1 and therefore all references to column and line number are found in 6,656,527. ***

WO '491 discloses a method for forming a porous silicon oxide insulating layer (col. 3, lines 23-24; col. 7, lines 45-47) comprising: a solution-applying step of applying a solution in which an insulating material is dissolved onto a workpiece; a solidified layer-forming step of forming a solidified layer by cooling the solution applied onto the workpiece to a temperature less than or equal to the melting point of a solvent contained in the solution; a drying step of removing the solvent contained in the solidified layer under reduced pressure to make the solidified layer porous; and a firing step of hardening the porous layer obtained by the drying step (col. 2 and col. 5, lines 64-67 of Gessner et al.).

As to claim 2, WO '491 teaches that a "very uniform thickness" is achieved, which results in a flattened surface of the applied layer (col. 7, lines 14-15 of Gessner et al.). The process of WO '491 would necessarily cover unevenness of the surface of the workpiece.

As to claim 5, WO '491 teaches aging the coated substrate prior to cooling, which meets the limitation of removing part of the solvent prior to the solidified layer-forming step (col. 5, lines 48-51 of Gessner et al.).

As to claim 14, WO '491 teaches vaporizing the solvent by sublimation (col. 2, lines 63-65 of Gessner et al.).

WO '491 lacks a teaching of performing an airtight step, or a step of melting a surface of the porous layer to enclose pores of the surface of the porous layer. You et al. is cited for its teaching of forming low dielectric insulating films by a spin method, similar to WO '491. You et al. discloses a post-application step of reflowing the dielectric material by using a high temperature device to melt it, which inherently melts the surface of the layer, to consolidate and even the surface (col. 18-19). Such a step would also necessarily result in enclosing pores, eliminating the air permeability, on the surface of the dielectric material.

It would have been obvious to one having ordinary skill in the art to have incorporated the reflowing step of You et al. in the method of WO '491 in order to similarly consolidate and even the resulting surface.

WO '491 in view of You et al. fails to teach using a flashing device to heat the substrate after application of the layer.

However, Arai et al. teaching of a method for heating a wafer, discloses applying a silicon oxide layer on the surface of the substrate, heating the substrate to a temperature and then flashing the substrate to a higher temperature (column 3, line 61 -

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Column 4, line 5). Arai et al. discloses using a flashing device, which makes the heating time shorter, for any heat treatment of a wafer (Column 1, line 34; Column 7, lines 4-6).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify WO '491 in view of You et al. to use the flash device as suggested by Arai et al. to provide a desirable heating of the wafer because Arai et al. discloses using a flash device is known in the art to provide fast heat treatments for a wafer and therefore would reasonably be expected to effectively provide enough heat to consolidate and even the surface of the substrate.

WO '491 in view of You et al. and further in view of Arai et al. fails to disclose providing a silicon nitride insulating layer. However, Arai et al. discloses a silicon nitride is a known substitute for silicon oxide insulating layers for wafers (Column 6, lines 54-57). Substitution of equivalents requires no express motivation. *In re Fount*, 213 USPQ 532 (CCPA 1982); *In re Siebentritt* 152, USPQ (CCPA 1967).

Claim 8: WO '491 (and the U.S. equivalent of Gessner et al.) in view of You et al. and further in view of Arai et al. does not explicitly teach applying the solution using a slit coater.

WO '491 teaches that "simple, conventional application methods" may be used for applying the solution in its invention (col. 3, lines 66-67 of Gessner et al.). Slit coating is a well-known, simple and conventional coating method in the coating art. It would have been obvious for one having ordinary skill in the art to have selected any

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conventional, simple coating method, including slit coating, with the expectation of successful results since WO '491 is not specifically limiting.

Claim 17: WO '491 WO '491 (and the U.S. equivalent of Gessner et al.) in view of You et al. and further in view of Arai et al. does not disclose the porosity of the formed layer. However, one skilled in the art would have recognized that the porosity is the result of the selected materials used, treatment temperatures and times, etc. It would have been obvious for one skilled in the art to have optimized the porosity. Alternatively, it is the Examiner's position that the process of WO '491 must necessarily achieve a porosity of 90% since it uses similar materials and process steps as those claimed by Applicant.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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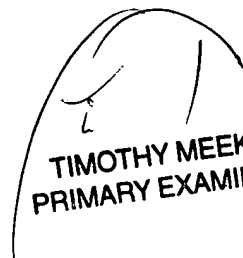
extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Turocy
AU 1762



TIMOTHY MEEKS
PRIMARY EXAMINER